

CLAIMS

What is Claimed is:

1. An electric power steering system for a vehicle comprising:
 - a steering wheel;
 - a steering shaft connected to said steering wheel; and
 - a switched reluctance motor coupled to said steering shaft for reducing driver effort that is required to turn said steering wheel, wherein said switched reluctance motor includes a stator including a plurality of circumferentially-spaced stator segment assemblies that include a stack of stator plates forming a stator segment core and winding wire wound around said stator segment core, a rotor defining a plurality of rotor poles, wherein said rotor tends to rotate relative to said stator to maximize the inductance of an energized winding, and a drive circuit that energizes said winding wire around said stator segment assemblies based on a rotational position of said rotor.
2. The electric power steering system of claim 1 further comprising:
 - a worm gear connected to said steering shaft; and
 - a worm threadably engaged to said worm gear, wherein said rotor of said switched reluctance motor is connected to said worm.

3. The electric power steering system of claim 1 wherein each of said stator plates includes:

a radially outer rim section; and

a tooth section that extends radially inwardly from a center portion of said radially outer rim section.

4. The electric power steering system of claim 3 further comprising:
an insulation layer located between said winding wire and said stator segment core.

5. The electric power steering system of claim 1 further comprising:
projections extending from opposite sides of a radially inner end of said tooth section.

6. The electric power steering system of claim 5 further comprising:
first and second end caps connected to opposite axial ends of said stator segment core; and

first and second end cap retainer sections that extend along said projections and that connect said first and second end caps,

wherein said first and second end caps and said first and second end cap retainer sections reduce movement of said winding wire during use.

7. The electric power steering system of claim 1 wherein said stator plates of said stator segment core include radial and lateral slits and first and second central portions that are deformed using a punch and press fit to hold said stack of stator plates together.

8. The electric power steering system of claim 1 wherein said drive circuit senses rotor position using sensorless techniques.

9. An electric power steering system comprising:
a steering wheel;
a steering shaft connected to said steering wheel;
a switched reluctance motor coupled to said steering shaft for reducing driver effort that is required to turn said steering wheel; and

a stator for said switched reluctance motor including a plurality of circumferentially-spaced stator segment assemblies that are arranged around an inner surface of said motor housing, each of said stators segment assemblies defining a salient stator pole that extends in a radially inward direction, wherein inter-pole stator slots are defined between adjacent stator segment assemblies, and said stator segment assemblies including a stack of stator plates forming a stator segment core and winding wire that is wound around said stator segment core.

10. The electric power steering system of claim 9 further comprising:
a worm gear connected to said steering shaft; and
a worm threadably engaged to said worm gear, wherein said rotor of said switched reluctance motor is connected to said worm.

11. The electric power steering system of claim 9 wherein each of said stator plates includes:

a radially outer rim section; and

a tooth section that extends radially inwardly from a center portion of said radially outer rim section.

12. The electric power steering system of claim 11 further comprising:

an insulation layer located between said winding wire and said stator segment core.

13. The electric power steering system of claim 9 further comprising:

projections extending from opposite sides of a radially inner end of said tooth section.

14. The electric power steering system of claim 13 further comprising:

first and second end caps connected to opposite axial ends of said stator segment core; and

first and second end cap retainer sections that extend along said projections and that connect said first and second end caps,

wherein said first and second end caps and said first and second axial end cap retainer sections reduce movement of said winding wire during use.

15. The electric power steering system of claim 9 wherein said stator plates of said stator segment core include radial and lateral slits and first and second central portions that are deformed to hold said stator segment core together.

16. An electric power steering system for a vehicle comprising:

a steering wheel;

a steering shaft connected to said steering wheel; and

a switched reluctance motor that is coupled to said steering shaft to reduce driver effort that is required to turn said steering wheel, said switched reluctance motor including a motor housing, a rotor that rotates relative to said motor housing, and a stator that is mounted on an inner surface of said motor housing, said stator including a plurality of circumferentially-spaced stator segment assemblies, wherein said stator segment assemblies include a stack of stator plates forming a stator segment core and winding wire that is wound around said stator segment core, wherein each of said stator plates has a generally "T"-shaped cross-section, a radially outer rim section, and a tooth section that extends radially inwardly from a center portion of said radially outer rim section.

17. The electric power steering system of claim 16 further comprising:

a worm gear connected to said steering shaft; and

a worm threadably engaged to said worm gear, wherein said rotor of switched reluctance motor is connected to said worm.

18. The electric power steering system of claim 16 further comprising:

an insulation layer located between said winding wire and said stator segment cores.

19. The electric power steering system of claim 16 further comprising:
projections extending from opposite sides of a radially inner end of said tooth
section.

20. The electric power steering system of claim 19 further comprising:
first and second end caps connected to opposite axial ends of said stator segment
core; and

first and second end cap retainer sections that extend along said projections and
that connect said first and second end caps,

wherein said first and second end caps and said first and second end cap retainer
sections reduce movement of said winding wire during use.

21. The electric power steering system of claim 16 wherein said stator plates of said
stator segment core include radial and lateral slits and first and second central portions that are
deformed to hold said stator segment core together.

22. The electric power steering system of claim 16 further comprising:
a drive circuit connected to said winding wire of said stator segment assemblies,
wherein said drive circuit senses rotor position using sensorless rotor techniques position.